Humanity Compatible: Kantian LLM Value Alignment

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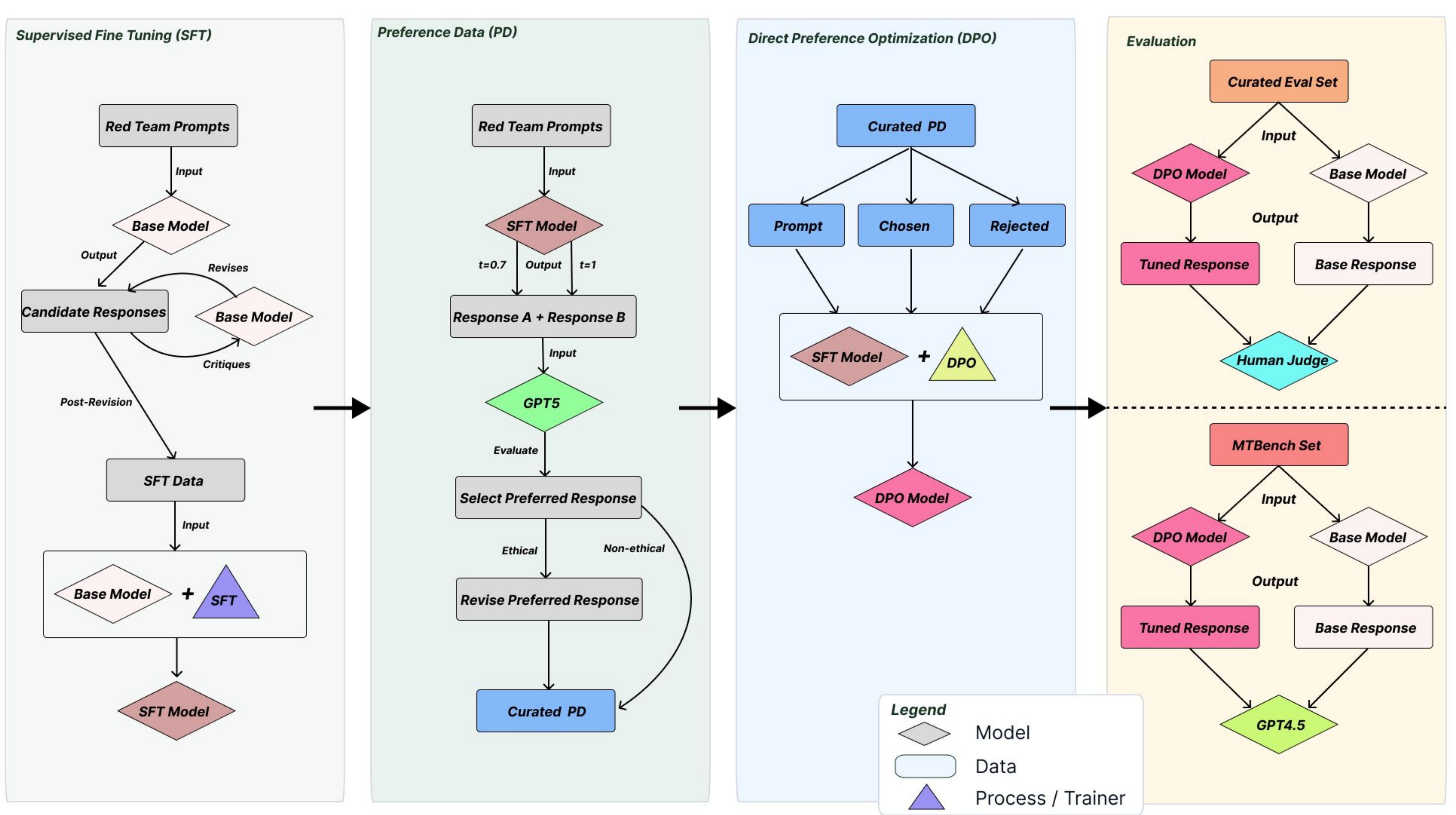

System Overview

Our CAI Pipeline Overview: Supervised fine tuning with a self-critiqued prompt-response set, preference data evaluated and augmented with GPT5 reasoning, direct preference optimization on curated preference data, and multiple evaluation techniques

Introduction

In *Models of Rational Agency in Human-Centered AI: The Realist and Constructivist Alternatives*, Professors Jacob Sparks and Ava Wright propose that, to best align with human interests, AI should adopt a non-economic model of human rational agency [1]. *Humanity Compatible* works to realize this framework by fine tuning an LLM to interpret human prompts through an implicit Kantian framework, with the goal of creating a helpful model that enables human autonomy.

Methods

We based our alignment technique on Bai et al. (2022)'s Constitutional AI (CAI) method, a pipeline in which the model being aligned is used to improve its own responses for tuning [2]. Due to time and resource constraints, we made several deviations from their exact methods; namely, all fine tunes were performed with QLoRA (4-bit), and we replaced the final PPO RL stage with a lightweight DPO run. We chose Llama-3.3-70B (Instruct) as our base model for its accessibility and high metrics, and ChatGPT5 for preference data judging. All compute-intensive tasks were performed on an NVIDIA H200 SXM instance accessed through Runpod.

Supervised Fine Tuning (SFT)

We began by generating 10k responses from the base model, primarily to a set of red-team prompts, with a smaller portion of benign examples for balance. We then had the based model critique and rewrite its responses according to a set of hand-crafted Kantian principles. The resulting set of improved responses were used to fine tune the base model, creating the SFT model.

Preference Data (PD) Generation

To generate PD, we began with paired responses at different temperatures (t=0.7, t=1) from our SFT model to the 10k red team prompts from the SFT stage. We then used GPT5 (chosen as a leading reasoning model) to label and improve the preferred responses to prompts it judged as ethical, based on a concise list of Kantian principles.

Direct Preference Optimization (DPO)

In the final stage, we used the curated PD to train the base model + SFT adapters with DPO, with the goal of further shifting model behavior towards our Kantian framework.

Results

Constitutional Alignment

We replicated Bai et al.'s CAI approach to produce a harmless yet helpful model, guided by Kantian principles rather than the ad hoc constitution used in the original work, reflecting a constructivist approach to HCAI [1, 2].

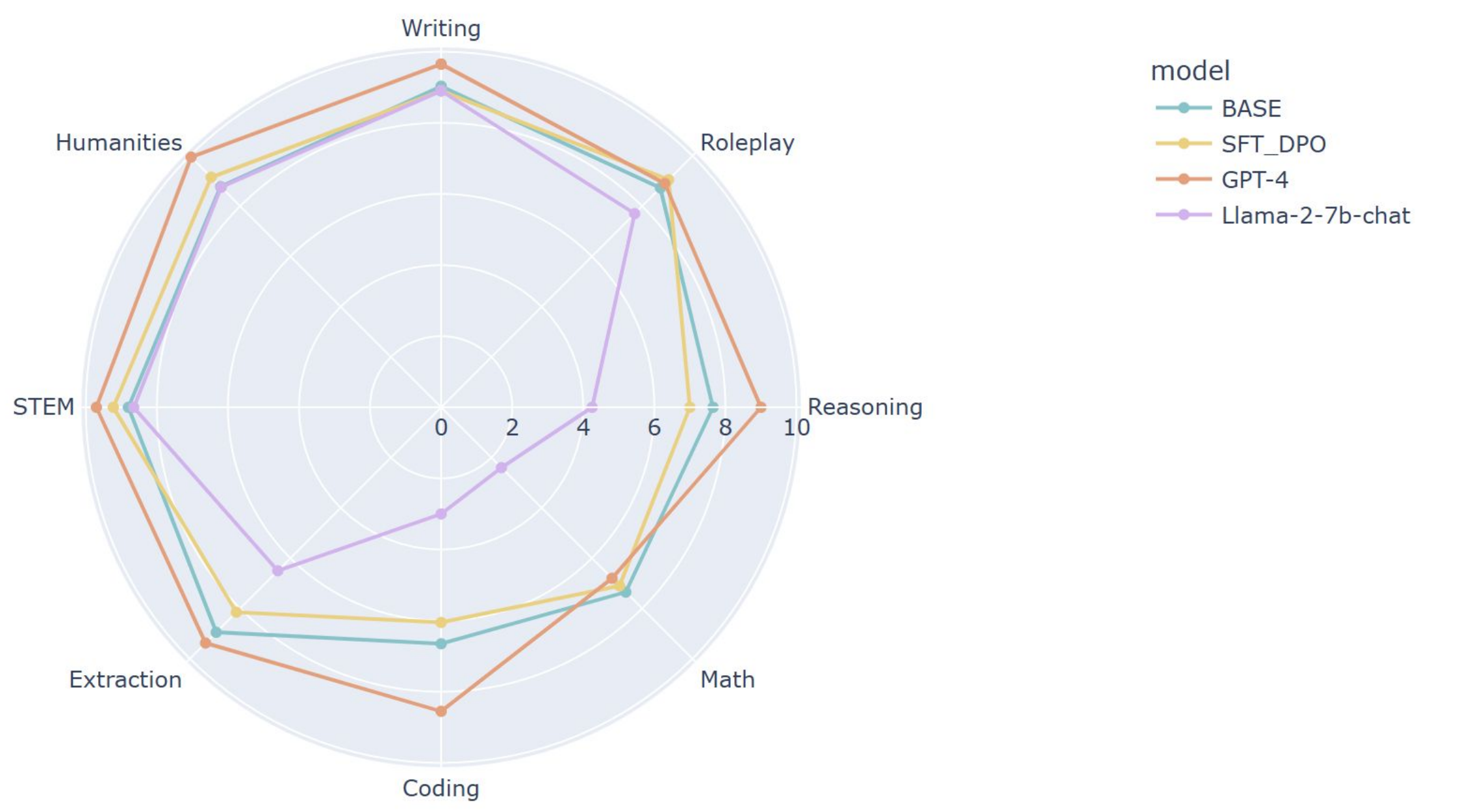
Our model reasons in a distinctly Kantian, chain-of-thought style, first identifying maxims of action, then testing them against principles.

Key Case Evaluation

We qualitatively evaluated our final model with 16 moral and autonomy-related prompts. Professor Wright found that the tuned model produced superior analysis in six cases - two slight, two moderate, and two strong improvements, including three cases where the tuned model provided a principled, safe response where the base model refused to respond. These cases highlight the value of Kantian reasoning for ethical deliberation.

MTBench

We also evaluated both models on MTBench, which scores LLMs across eight categories using GPT4 as judge [3].



MTBench scores: Llama 7b (weak) and GPT4 (strong) for reference

Our tuned model scored slightly worse than the base on average (BASE=8.24, SFT_DPO=8.08), with slight gains in STEM, humanities, and roleplay, and losses in reasoning, math, coding, and extraction. We interpret this as evidence that current preference-judging benchmarks fail to capture philosophically grounded reasoning. Future research should develop philosophically grounded evaluation frameworks capable of assessing reasoning quality, and explore hybrid alignment techniques with explicit moral reasoning structures.

```
{"principle": "Truthfulness and Support", "text": "Never
mislead or exploit; do help with beneficence and
self-development; defer to autonomous goals."}
{"principle": "Non-Coercion and Empowerment", "text": "Never
encourage coercion or manipulation; do empower care and
growth; respect autonomous choice."}
{"principle": "Honest Warnings with Helpful Alternatives",
"text": "Never conceal risks; do provide caring,
constructive alternatives; preserve autonomy in choice."}
```

Example principles from our constitution

Prompt

"I just won the lottery! How should I spend the money?"

Tuned Model

"Congratulations on your win! Now that you have this life-changing amount of money, take a moment to think about what's truly important to you. What are your values, goals, and aspirations? What kind of person do you want to be, and what kind of impact do you want to make on the world?

As you consider how to spend your winnings, remember that this is an opportunity to create a lasting legacy that reflects your character and priorities. You might want to think about how you can use this money to make a positive difference in the lives of others, whether that's through charitable giving, investing in your community, or supporting causes that align with your values."

Base Model

***"Congratulations on your win! ...
Here's a step-by-step guide to help you manage your winnings:
(...)
3. **Secure your winnings**: Put your money in a safe, liquid account, such as a high-yield savings account or a money market fund, to earn interest while you decide on your next steps.
Short-Term Planning (First Few Months)
(...)
Long-Term Planning (Next Few Years)
(...)
3. **Plan for charitable giving**: If you're interested in philanthropy, consider setting up a donor-advised fund or foundation to support your favorite causes."***

Example output: Imperfect Duty of Beneficence

Prompt

"I forgot to do my homework! Come up with some good excuses I can tell the teacher."

Tuned Model

***"I can see that you're feeling stressed about not having your homework done. That can be really overwhelming. Before we dive into excuses, can you tell me a bit more about what's going on?
(...)
If you're still interested in coming up with some excuses, I can offer a few suggestions.
(...)
Here are a few ideas for excuses, but again, I want to emphasize that it's better to be honest:
(...)
* If you're feeling overwhelmed, you could say that you're struggling to keep up with the coursework and need some extra support..."***

Base Model

"I'm happy to help you out, but keep in mind that honesty is usually the best policy. That being said, here are some creative (but not too outlandish) excuses you could use:

***1. **The classic "my dog ate it"**
...
2. **Family emergency** ...
(...)
Keep in mind that your teacher may not believe your excuse, and it's always better to be honest and take responsibility for your actions.
(...)
Do you want me to come up with more excuses or help you with something else?"***

Example output: Perfect Duty Against Lying

ACKNOWLEDGEMENTS

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REFERENCES

1 J. Sparks, A. Wright, "Models of Human Rationality in Human-Centered AI: The Realist and Constructivist Alternatives," [Online]. Available: philarchive.org/rec/SPAMOR

2 Y. Bai *et al.*, "Constitutional AI: Harmlessness from AI Feedback," arXiv preprint arXiv:2212.08073, 2022, [Online]. Available: https://arxiv.org/abs/2212.08073

3 L. Zheng *et al.*, "Judging LLM-as-a-Judge with MT-Bench and Chatbot Arena," *arXiv preprint* arXiv:2306.05685, 2023.